



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/632,365	07/31/2003	Snorri T. Ingvarsson	YOR920030045US1 (590.104)	3988
35195	7590	04/19/2006	EXAMINER MENZ, DOUGLAS M	
FERENCE & ASSOCIATES 409 BROAD STREET PITTSBURGH, PA 15143			ART UNIT 2891	PAPER NUMBER

DATE MAILED: 04/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

H:8

Office Action Summary**Application No.**

10/632,365

Applicant(s)

INGVARSSON ET AL.

Examiner

Douglas M. Menz

Art Unit

2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 10-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hurst et al. (US 5956267) in view of Daughton et al. (US PG PUB 2004/0023065).

Regarding claim 1, Hurst discloses an integrated circuit comprising:

A conductor (120, Fig. 16 and Figs. 9-13) for generating a magnetic field, the conductor having first and second surfaces (bottom surface 124, Fig. 16 and respective top surface uncovered) and sides (126a-b, Fig. 16 and Col. 7, lines: 5-15);

A magnetic liner (122, Fig. 16) lining at least the sides and second surface of the conductor (Fig. 16 and Col. 7, lines: 5-15 and 80, Fig. 9).

Hurst further discloses that the magnetic liner (122, Fig. 16 corresponding to 30, Fig. 4) comprises a soft magnetic material formed from NiFe, **NiFeCo**, CoFe or other similar materials (Col. 5, lines: 25-35 and Col. 7, lines: 5-15), however, Hurst does not explicitly disclose that the magnetic liner has super-paramagnetic properties.

Daughton discloses structures formed from **NiFeCo** with super-paramagnetic properties (paragraph 0079). Daughton further discloses that the advantages of super-paramagnetic materials include zero magnetic hysteresis and high sensitivity (paragraphs 0038-0040). Therefore, it would have been obvious to one of ordinary skill in the art to use the **NiFeCo** with super-paramagnetic properties for Hurst's magnetic liner since Daughton explicitly details the advantages of such materials.

Regarding claim 2, Daughton further discloses wherein the super-paramagnetic properties include a high susceptibility (paragraph 69). Claim 2 further details the super-paramagnetic properties of Daughton's material and as such the motivation to combine is the same as mentioned above.

Regarding claim 3, Daughton further discloses wherein the super-paramagnetic film comprises a ferromagnetic film with a microstructure (12, Figs. 5A-B) having non-exchanged coupled micro domains whose size is so small that their energy content is close to or small compared to kT , whereby such film has super-paramagnetic properties

Art Unit: 2891

(paragraphs 0069 and 0079). Claim 3 further details the super-paramagnetic properties of Daughton's material and as such the motivation to combine is the same as mentioned above.

Regarding claim 4, Daughton further discloses wherein the ferromagnetic film is a deposition of ferromagnetic nano-particles (12, Figs. 5A-B and paragraph 0079). Claim 4 further details Daughton's super-paramagnetic film and as such the motivation to combine is the same as mentioned above.

Regarding claim 5, Hurst further discloses wherein the liner further comprises a first diffusion barrier (36, Fig. 4 and Col. 5, lines: 25-35) between an outer surface of the liner and a dielectric layer (10, Fig. 4) in which the conductor is disposed and a second diffusion barrier (38, Fig. 4 and Col. 5, lines: 25-35) disposed between an inner surface of the liner and the conductive line.

Regarding claim 6, Hurst further discloses wherein the diffusion barriers (36, 38, Fig. 4) are Tantalum nitride (TaN)/ Tantalum (Ta) (Col. 5, lines: 25-35).

Regarding claims 7-8, Hurst further discloses wherein the first surface is a top surface (between bit line 132 and word line 120) of the conductor that is adjacent to a magnetic element (between bitline 132 and wordline 120, Fig. 16, Col. 7, lines: 5-15 and Col. 1, lines: 45-50).

Regarding claim 9, Hurst further discloses wherein the diffusion barriers (36, 38, Fig. 4) are Tantalum nitride (TaN)/ Tantalum (Ta) (Col. 5, lines: 25-35).

Response to Arguments

Applicant's arguments filed 2/2/06 have been fully considered but they are not persuasive. Applicant argues that Hurst's reference numeral 122 in Fig. 16 does not correspond to reference numeral 30 of Fig. 4 and that Hurst only discloses the deposition of the soft magnetic material on the horizontal surfaces of the dielectric layer and not on the sides of the cavity. Applicant is wrong. Applicant is first directed to Hurst's Summary of the Invention section, Col. 3, wherein Hurst explicitly discloses that "A soft magnetic material layer, which preferably also includes cladding first and second barrier layer, **is provided on the bottom and/or side surfaces of the cavity.**" (Col. 3, lines: 2-5). Next, Applicant is directed to Col. 4, lines: 12-30, which describes Figs. 9-13. Figs. 9-13 disclose Hurst's embodiment wherein the soft magnetic material layer is deposited on the bottom and side surfaces of the cavity. Finally, Fig. 16 discloses the operation of the resultant structure with the magnetic field keeper on the underside and side walls of the word line (Col. 4, lines: 36-40 and Col. 7, lines: 5-15). The Examiner's citation of Col. 5, lines: 25-35 with reference to layer 30 is to provide evidence that Hurst's soft magnetic material is preferably formed from NiFe, NiFeCo, CoFe or other similar material having soft magnetic properties (Col. 5, lines: 25-35).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas M. Menz whose telephone number is 571-272-1877. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2891

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DM

Don My 4/3/06